



FCC / IC Test Report

FOR:

Intel Corporation

Model Name: EP110

Product Description: Intel 4.7-inch Smartphone with GSM, GPRS, EDGE, UMTS, HSPA+, LTE, WLAN, BT and GPS radios

FCC ID: O2Z-EP110

IC ID: 1000W-EP110

47 CFR PART 15.403 U-NII, DFS

IC RSS-210 Issue 8, Annex 9 (Local Area Network Devices), DFS

TEST REPORT #: EMC_INTEL-054-14001_UNII_Rev1

DATE: 2014-11-13



FCC :
Accredited

IC recognized #
3462B-1

CETECOM Inc.

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1 Assessment

The following equipment (and as identified in Ch.3 of this test report) was evaluated against the applicable criteria specified in FCC CFR47 Part 15.403 subpart E and Industry Canada Standards RSS-210 Issue 8, Annex 9.

No deviations were ascertained during the course of the tests performed.

Company	Description	Model #
Intel Corporation	Intel 4.7-inch Smartphone with GSM,GPRS,EDGE,UMTS,HSPA+,LTE, WLAN, BT and GPS radios	EP110

Responsible for Testing Laboratory:

Franz Engert			
2014-11-13	Compliance	(Manager Compliance)	
Date	Section	Name	Signature

Responsible for the Report:

Jennifer Huang			
2014-11-13	Compliance	(Compliance Technician)	
Date	Section	Name	Signature

The test results of this test report relate exclusively to the test item specified in Section3.

CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CETECOM Inc. USA.

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Address:	411 Dixon Landing Road Milpitas, CA 95035 U.S.A.
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Test Lab Manager:	Franz Engert
Responsible Project Leader:	Saman Rami

2.2 Identification of the Client

Applicant's Name:	Intel Corporation
Street Address:	2200 Mission College MS:SC1-20
City/Zip Code	Santa Clara, CA 94085
Country	USA
Contact Person:	Christine Ryan
Phone No.	+1 (408) 300-2167
e-mail:	Christine.m.ryan@intel.com

2.3 Identification of the Manufacturer

Manufacturer's Name:	Same as client.
Manufacturers Address:	
City/Zip Code	
Country	

3 Equipment under Test (EUT)

3.1 Specification of the Equipment under Test

Marketing Name / Model No:	Intel 4.7-inch Smartphone / EP110
HW Revision :	PR2
FCC-ID / IC-ID:	O2Z-EP110 / 1000W-EP110
Product Description:	Intel 4.7-inch Smartphone with GSM,GPRS,EDGE,UMTS,HSPA+,LTE, WLAN, BT and GPS radios
Authorized Frequency Range:	Nominal bands: 5150 – 5250 (band 1) 5250 – 5350 (band 2) 5470 – 5725 (band 3) 5.725– 5825 (band 4)
Modes of Operation	UNII-1 Client with passive scan for indoor use only UNII-2/2e Client with passive scan UNII-3 Client with Active Scan, Hotspot and ad-hoc mode DFS client only TCP is not supported Channels 12-14, 118 - 128, 138 – 144 are not supported 1 transmit and 1 receive chain (no MIMO technology support) The detail channel plan is given in the manufacturer's Operational Description which is part of the exhibits for the FCC/IC filings.
Type(s) of Modulation:	Wi-Fi: 802.11a,n,ac: OFDM with either BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM
Channel Bandwidth:	This report covers all channels with 20MHz, 40MHz and 80MHz bandwidths for UNII-1, UNII-2 and UNII-2e as well as the 40MHz and 80MHz bandwidths of UNII-3 under rule part 15.407(15E) 20MHz channels 149 - 165 are treated under rule part 15.247 (15C) in the corresponding report.
Data rates used:	802.11b: 1 Mbps ; 802.11a/g: 6 Mbps ; 802.11n: 6.5 Mbps; 802.11 ac
Antenna/Antenna gain:	Internal PCB-trace antenna / highest declared Antenna Gain: -1.8dBi in band 4.
Declared Output Powers:	According to "EP110 Maximum RF Output Power Declaration" included in filing.
power supply	AA lithium battery pack (dedicated) Voltage Range 3.6V-4.2V DC Nominal Voltage 3.8V DC
Operating temperature range	-10°C to +55°C

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Prototype / Production unit	Prototype
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3.2 Identification of the Equipment Under Test (EUT)

EUT #	Serial Number	HW Version	SW Version	Notes/Comments
1	INV141400226	PR2	4.4.4 KTU84P main engineering 53181- dev-keys	RF Conducted Sample

3.3 Identification of Accessory equipment

STE #	Type	Manufacturer	Model	Serial Number
1	AC/DC Adapter	Solcomp	SC1402	1309500144736

4 Subject of Investigation

The objective of the measurements applied by CETECOM Inc. was to establish compliance of the EUT as described under Ch. 3 of this Test Report, with the applicable criteria specified in

- FCC CFR47 Parts 15.403
- IC RSS-210 Issue 8, Annex 9
- 905462 D01 UNII DFS Compliance Procedures Old Rules v01

This test report is to support a request for new equipment authorization under the FCC ID: O2Z-EP110 and IC ID: 1000W – EP110.

5 Summary of Measurement Results

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
15.403 RSS-210 A9.4	DFS	Nominal	802.11a/n/ac	■	□	□	□	Complies

Note: NA= Not Applicable; NP= Not Performed.

6 Measurements

6.1 Measurement Uncertainty

	Uncertainty in dB radiated <30MHz	Uncertainty in in dB radiated 30MHz - 1GHz	Uncertainty in dB radiated > 1GHz	Uncertainty in dB Conducted measurement
standard deviation k=1	2.48	1.93	2.16	0.63
95% confidence interval in dB	4.86	3.79	4.23	1.24
95% confidence interval in dB in delta to Result	+/-2.5 dB	+/-2.0 dB	+/- 2.3dB	+/-0.7dB

6.2 Test Conditions

Temperature: 19°C to 25°C;
Operating Voltage: 3.8V for radio measurements;
Relative Humidity 20% to 50%

6.3 Dates of Testing:

09/19/2014 – 10/03/2014

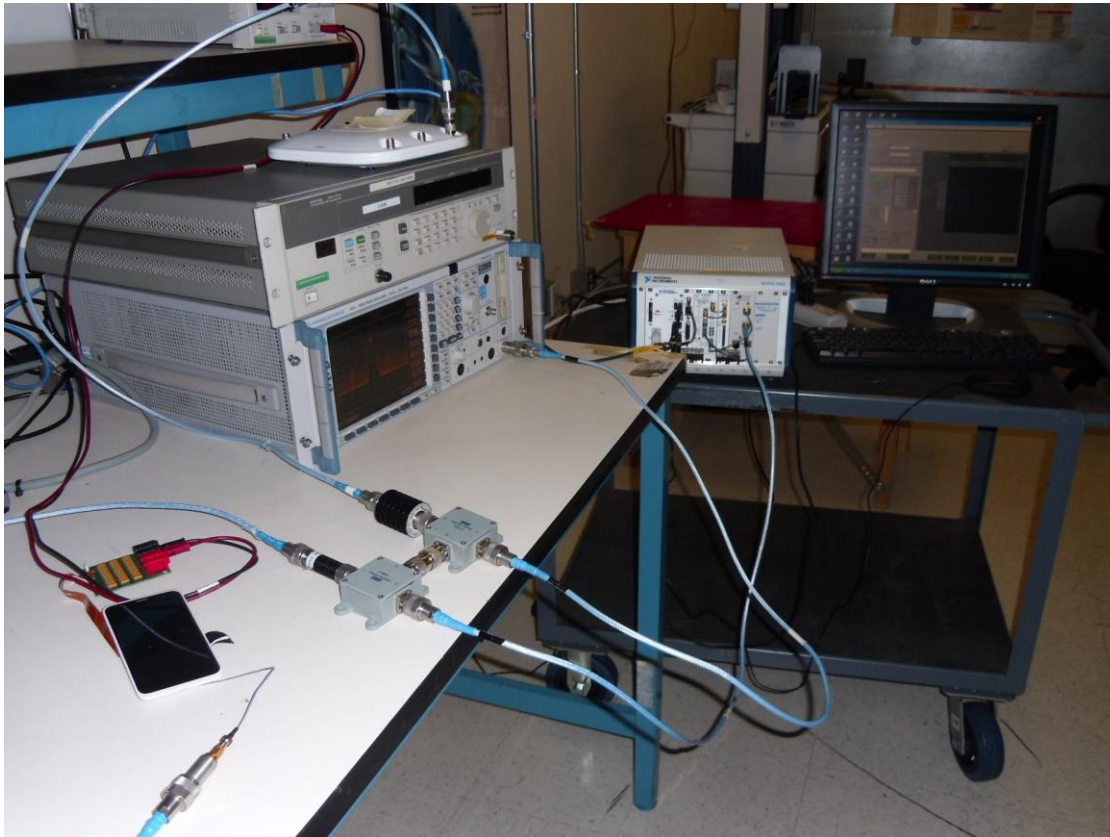
6.4 DFS

6.4.1 References:

- 905462 D01 UNII DFS Compliance Procedures Old Rules v01

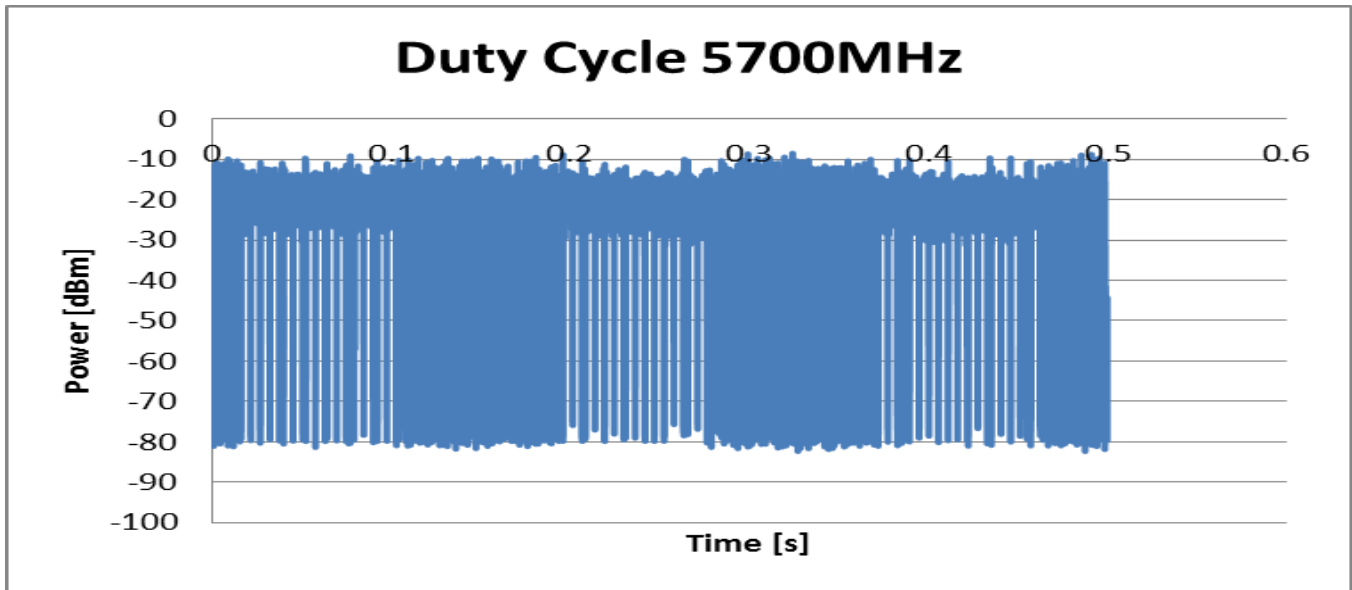
6.4.2 Test Setup:

The DUT was connected via 50Ohm conducted port to a CISCO AP (AIR-AP1262N-A-K9) with FCC ID: LDK102073 and S/N: FTX1553E037. Traffic was stimulated by means of several ping processes. The levels of AP and station were setup in a way that the station level was 20dB higher than the AP level by the usage of attenuators. The connection utilized a 40MHz bandwidth as described in KDB 848637 as an AP with 80MHz support was not available at the time of testing. The SA trace was triggered by the radar signal from the DFS Generator / PXI-5421 card.



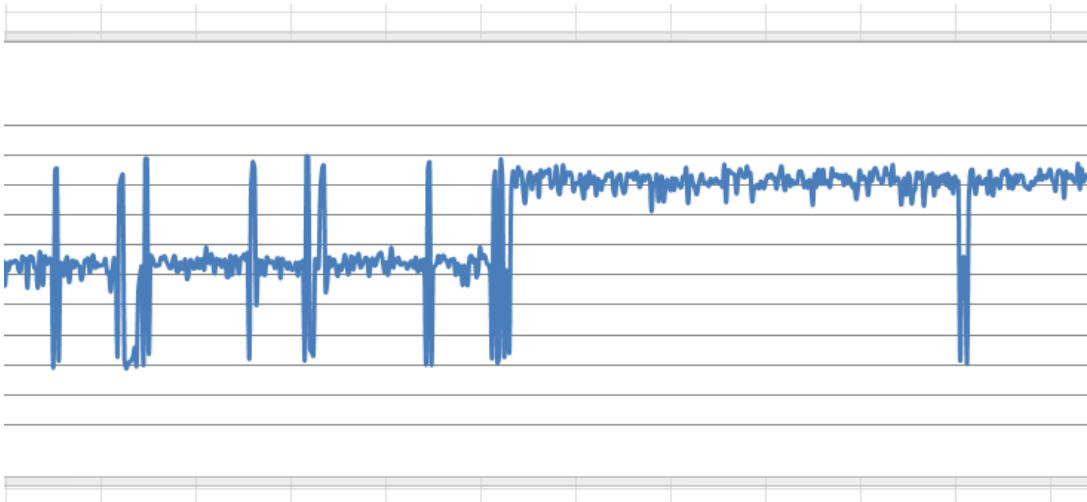
6.4.3 Result:

6.4.3.1 Effective Duty Cycle during Traffic 49.1%



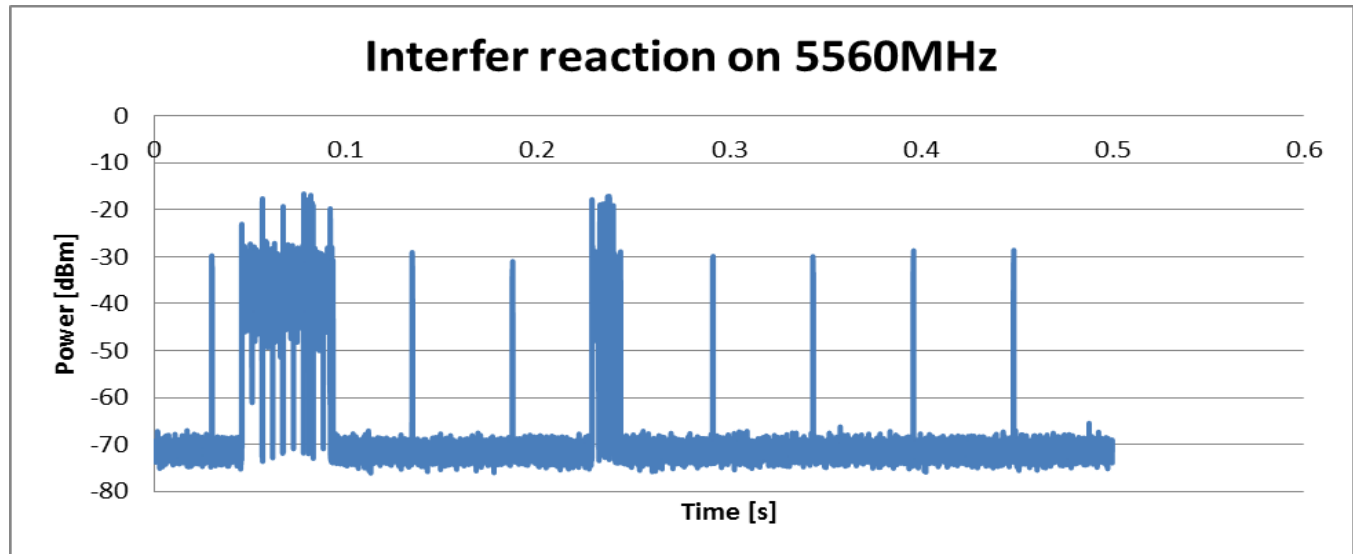
Note: The Duty Cycle of 49.1% was calculated from the raw data used to generate this plot. A longer swept time will result in incorrect calculation of the duty cycle as no more than 25k trace points are available.

6.4.3.2 Zoom of a random region of duty cycle plot



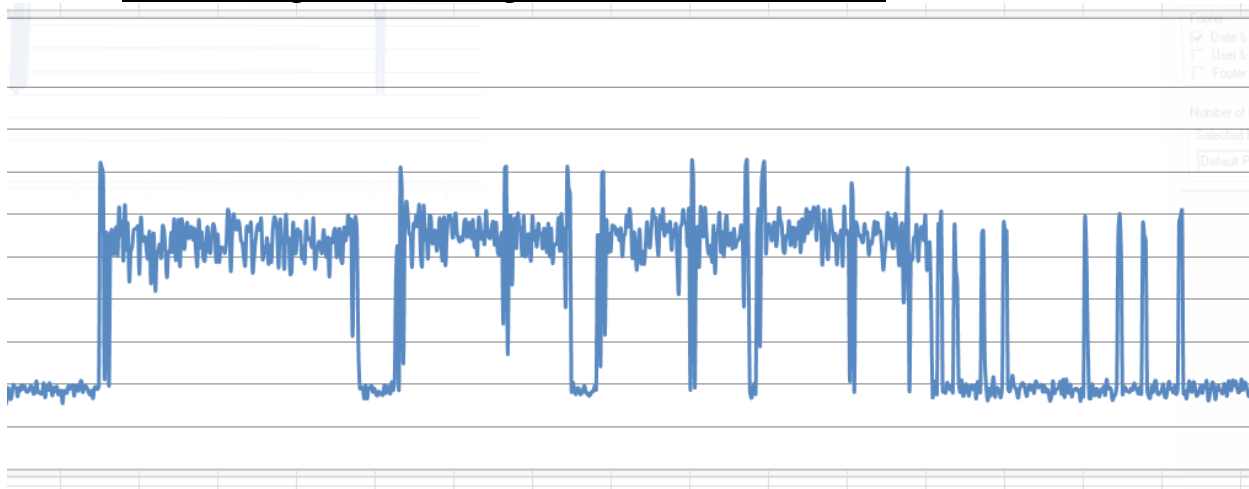
6.4.3.3 Reaction to Radar interferer first 500ms of channel move time

After the initial 200ms after radar interferer there is a 0.24ms accumulated transmit time. Well below the limit of 60ms.



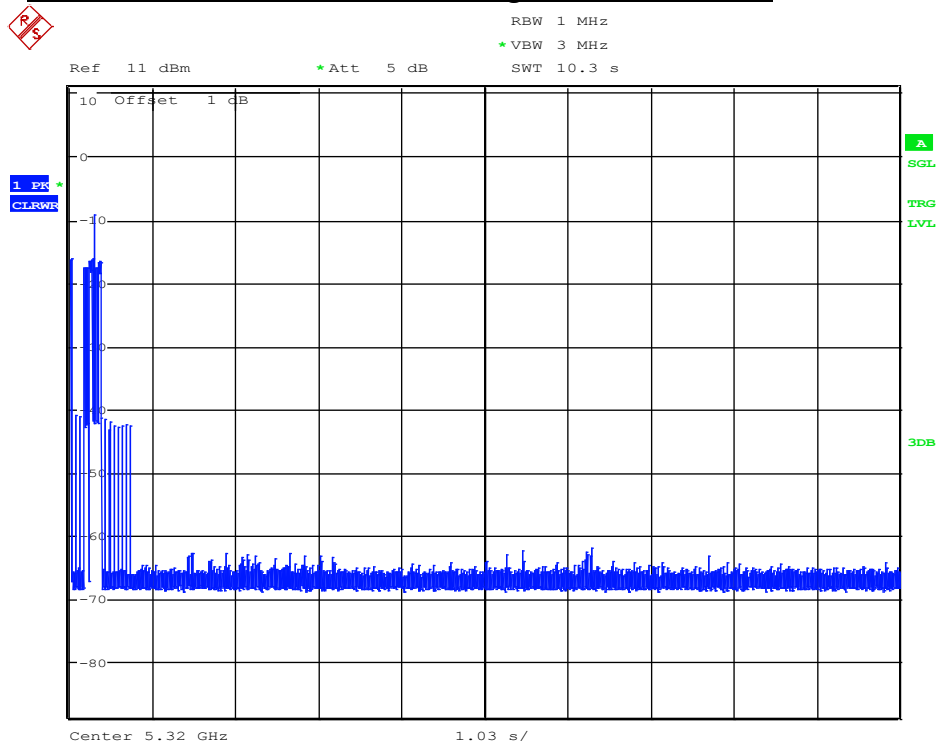
Note: The 0.24ms accumulated transmit time was calculated from the raw data used to generate this plot. A longer swept time will result in incorrect calculation of the duty cycle as no more than 25k trace points are available.

6.4.3.4 Zoom into region of remaining transmits after initial 200ms



Note: The zoom shows only short ACK transmissions from the EUT. No more traffic.

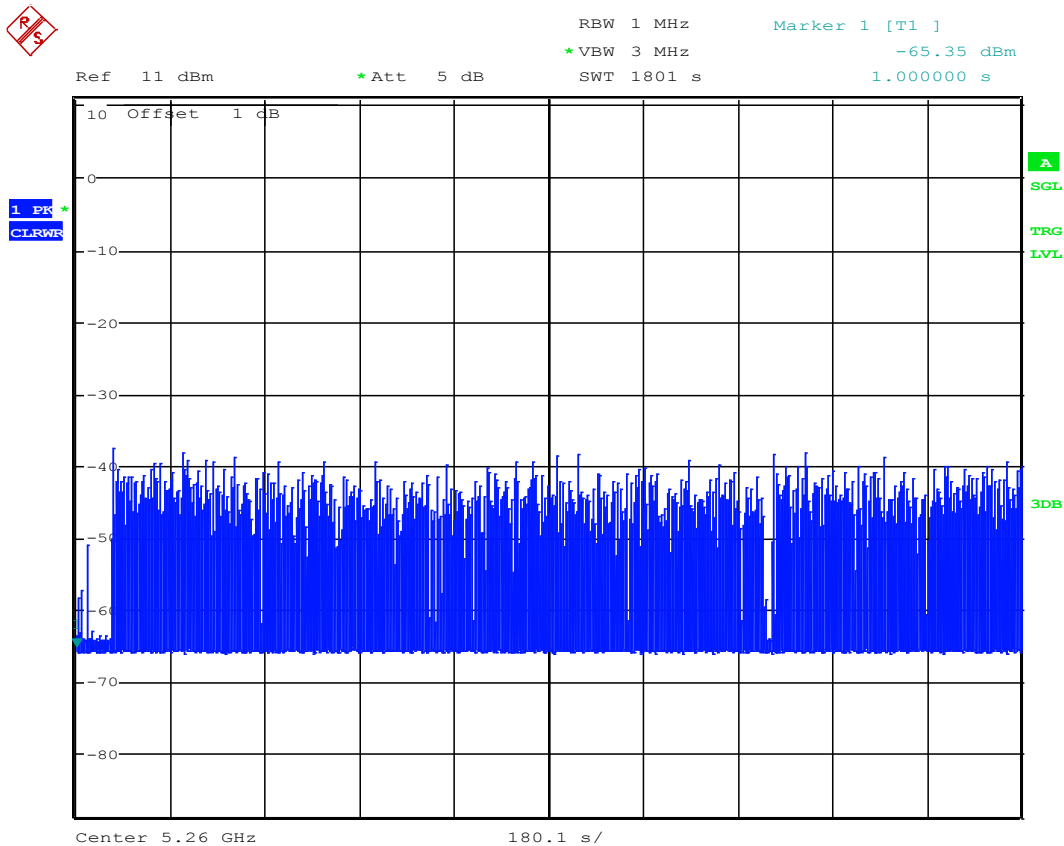
6.4.3.5 Reaction to Radar interferer remaining channel move time



Date: 19.SEP.2014 15:34:20

Note: There are no remaining transmit bursts from the EUT after the initial 500ms covered by the high resolution results above.

6.4.3.8 30min non occupancy time in time domain:



Date: 19.SEP.2014 17:09:43

6.4.3.9 Verdict:

Passed in the scope of DFS slave. Spurious emissions will be quantified in the UNII report.

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7 Test Equipment and Ancillaries used for tests

Item Name	Manufacturer	Equipment Type	Model	Serial #	Calibration Cycle	Last Calibration Date
FSU 26	R&S	Spectrum Analyzer	FSU 26	100189	2 Years	6/1/2013
DFS Generator / PXI-5421 card	National Instruments	NI PXI-1042		E965F1	3 years	7/3/2012
DFS Upconverter PXI-5610 card	National Instruments	NI PXI-1042		E93740	3 years	6/29/2012

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8 Revision History

Date	Report Name	Changes to report	Report prepared by
2014-10-03	EMC_INTEL-054-14001_DFS	First official version	Franz Engert
2014-11-13	EMC_INTEL-054-14001_DFS_Rev1	Corrected Antenna Gain, Corrected KDB reference to old version	Franz Engert